

THE INDO-CHINESE AND OCEANIC RACES—
TYPES AND AFFINITIES¹

II.

A BELIEF in sorcery is very general, especially amongst the Melanesians, and some of the practices associated with it often resemble those prevalent amongst the Australians and African Negroes, and even in mediæval times in Europe. In Tanna, New Hebrides group, Dr. G. Turner tells us that the real gods "may be said to be the disease-makers. It is surprising how these men are dreaded, and how firm the belief is that they have in their hands the power of life and death. There are rain-makers and thunder-makers, and fly- and mosquito-makers, and a host of other 'sacred men'; but the disease-makers are the most dreaded. It is believed that these men can create disease and death by burning what is called *nahak*. Nahak means rubbish, but principally refuse of food. Everything of the kind they burn or throw into the sea lest the disease-makers should get hold of it. These fellows are always about, and consider it their special business to pick up and burn, with certain formalities, anything in the nahak line that comes in their way. If a disease-maker sees the skin of a banana, for instance, he picks it up, wraps it in a leaf, and wears it all day hanging round his neck. The people stare as they see him go along, and say to each other, 'He has got something; he will do for somebody by and by at night.' In the evening he scrapes the bark off a tree, mixes it with the banana skin, rolls up tightly in a leaf in the form of a cigar, and then puts the one end close enough to the fire to cause it to singe, and smoulder and burn away gradually. Presently he hears a shell blowing. 'There,' he says to his friends, 'there is the man whose rubbish I am now burning; he is ill. Let us stop burning and see what they bring in the morning.'

"When a person is taken ill he believes it is occasioned by some one burning his rubbish. Instead of thinking about medicine he calls some one to blow a shell, which, when perforated and blown, can be heard two or three miles off. The meaning of this is to implore the person who is supposed to be burning the sick man's rubbish and causing all the pain to stop burning; and it is a promise as well that a present will be sent in the morning. The greater the pain, the more they blow the shell, and when the pain abates they cease, supposing that the disease-maker has been kind enough to stop burning. Then the friends of the sick man arrange about a present to be taken in the morning. Pigs, mats, knives, hatchets, beads, whales' teeth, &c., are the sort of thing taken. Some of the disease-making craft are always ready to receive the presents and to assure the party that they will do their best to prevent the rubbish from being again burnt. If the poor man has another attack at night he thinks nahak is again burning. The shell is again blown, and so they go on; and if he dies his friends lay it all down to the disease-makers, as not being pleased with the presents taken and as having burned the rubbish to the end. The idea is that whenever it is all burned the person dies." ("Nineteen Years in Polynesia.") Substitute for the nahak a waxen image of the absent victim, and you have in this account a perfect parallel to the belief in the power of witchcraft to injure at a distance universal at all times in Europe:—

"Devovet absentes, simulacraque cœca fingit,
Et miserum tenues in jecur urget acus."
(Ovid, *Epist.* 6.)

But this merely shows how little reliance can be placed on similarity of manners and customs in tracing the affinities of races. The mind of man having sprung, as seems most probable, from one original centre, is everywhere very much the same in the infantile or undeveloped

¹ Continued from p. 203.

stage. Hence, like practices under like conditions may very well arise independently in diverse places without implying any ethnical relationship or even any necessary social contact. The most extravagant theorist would scarcely venture to suggest any direct relationship of any sort between the Papuans, for instance, and the Basques; yet amongst the young girls of both races the extraordinary taste for making pets of little pigs prevails. At least the practice is spoken of by recent explorers as common in New Guinea, while M^{me}. d'Aulnoy ("Relation du Voyage d'Espagne," Paris, 1691) was greatly surprised to find the young Basque ladies of Bayonne indulging in the same habit when she visited the place in 1679. "Some of those who came to see me had a little sucking-pig tucked under their arms, just as we carry our little lap-dogs. Several had ribbons of different colours tied round their necks as collars. But when the ladies joined in the dance they were obliged to let the horrid beasts loose in the room, where they made more noise than so many imps." The "couvade" is another remarkable custom attributed both to the Basques and to the Buru Islanders, Eastern Archipelago, in common with many other peoples ancient and modern in the Old and New World. But M. Julien Vinson (*République Française*, January 19, 1877) has shown that, at least as far as regards the Basques, there is little or no ground for the statement. We all know what astonishing conclusions as to ethnical affinities certain ethnologists have drawn from the assumed common prevalence of this eccentric fashion amongst the most widely-dispersed nations. Yet even if it did exist amongst them such conclusions would be otherwise inadmissible.

It may be mentioned that the missionaries have been for some years at work amongst the Mafar people and their kinsmen of Dorey, into whose language they have translated several tracts and portions of Scripture. Here is a specimen from Genesis i. 1 ("In the beginning," &c.): "Beponeia kaku manseren allah ibejadi nangi ma dūnya. Dūnya ibeūrba ma ibro beri, ma ifnurep kōn ro bo i, ma rūr manseren allah biēda iriob ro bo wāreya." The Malay, or rather Arabic words, *allah*, God, *dūnya*, earth, *rūr* for *rūh*, spirit, are of course borrowed by the translator; but the structure of the language is entirely different, being highly agglutinating and employing both pre- and post-fixes, like other Papuan dialects. In other respects the Papuan and Melanesian tongues differ so profoundly from each other that it is impossible to group them in one linguistic family. As a rule they possess absolutely nothing in common beyond a certain uniformity of structure and such verbal resemblance as is due to Malay and Sawaiori influences. These influences are very wide-spread, as shown especially in the numerals, which the dark races have almost everywhere borrowed from their brown and olive neighbours. But they often still retain the old quint system at one time common to Indo-China and Malaysia, but in the Oceanic area now mostly replaced by the decimal. Thus in the Duke of York Islands, between New Britain and New Ireland, the five first numerals only are taken from the Sawaiori or Eastern Polynesian, the numbers beyond five being expressed by addition, as in Cambodian and several Malayan and Western Papuan dialects. Hence for the Samoan *e ono* = six, *e sefulu* = ten, we have *limadi ma ra* = 5 + 1, *limadi ma limadi* = 5 + 5, where *limadi* is from the Samoan or Eastern Polynesian *lima* = 5. By an analogous process the numerous Sawaiori words that have found their way especially into the Eastern Papuan idioms are always compelled to conform to the agglutinating character of Papuan grammar. Thus the Fijian and Duke of York *tama* = brother, apparently answering to the Samoan *tama* = boy, assume the pronominal post-fixes *zu*, *g*, *na*, &c., peculiar to those groups, the Fijian *tamazu* and Duke of York *tamag* being equivalent to the Samoan *o lo'u tama* = my brother or my boy. Here we

clearly see how entirely the structure of the Papuan differs from that of the Sawaiori tongues, and how constant is the law that languages of different systems may borrow any number of words from each other, while each invariably retains its own grammatical genius. Hence, when we hear of mixed Papuan, Malayan, and Sawaiori tongues in these regions the expression is always to be understood as referring to the vocabularies only, never to the grammar or structure of those languages. In philology there is no rarer phenomenon than mixed grammatical systems, though perhaps it might be premature to deny the absolute possibility of such mixture.

III. THE AUSTRAL RACES: *Australians*; *Tasmanians* (?)

The area occupied by this division of the dark races is limited to the Australian continent and neighbouring island of Tasmania. Here we enter an entirely new ethnical world, for, although the extinct Tasmanians betray certain doubtful affinities to the Melaneseans, the Australians stand quite apart. They are usually represented as black, straight-haired, dolichocephalous, and prognathous. But this general description can pretend to no scientific accuracy, and in any case it is extremely doubtful whether they can be regarded as all belonging to one original stock. Topinard, who has devoted great attention to the subject, recognises at least two distinct aboriginal types, the fusion of which results in the average Australian as above described, and whose essential peculiarity may be said to consist in the combination of more or less negroid features with straight hair. The more primitive race, found mainly on the low-lying coast tracts about King George's Sound, in the north-west and extreme east, is described as of short stature, very black and prognathous, with woolly or at least frizzly hair; the second and finer race, occupying the interior, and especially the north-eastern highlands, are much taller, of lighter colour, with straight or wavy hair, and slight prognathism.

But, notwithstanding these discrepancies, Brough Smith well observes that "throughout Australia the natives exhibit a general conformity to one pattern as regards features, colour, and mental character. A man from Southern Gippsland [Victoria] would be recognised as an Australian by the inhabitants of Port Essington, and a native of King George's Sound would be surely known if taken to York Peninsula." This common racial instinct or fellow-feeling is perhaps our best justification for treating as an independent ethnical group a people for whom affinities have been sought far and wide, by Huxley with Logan in India, by others in Polynesia, Egypt, Europe, or America. One of the arguments adduced in support of an Egyptian or Indian relationship is based on the assumed resemblance of the throwing-sticks of those peoples with the Australian womguine or boomerang; but Brough Smith ("The Aborigines of Victoria," i. p. 323), who has gone thoroughly into this question, concludes that "it is safe to deny the affinity of the Dravidian or Egyptian boomerang with that of the Australian native, because the first, under no circumstances whatever, could be made to behave as the womguine does. The flat leaf-like weapon of the Australian differs essentially from the Egyptian crooked stick." Much reliance is also placed on a certain resemblance between the Dravidian and Australian systems of kinship. But when we find that L. H. Morgan discovered a somewhat similar system prevailing throughout the North American tribes, and that the Rev. Lorimer Fison was able to extend its domain to the South Sea Islanders, we begin to attach less importance to a character of this sort. *Quod nimis probat nihil probat* was a sound maxim amongst the schoolmen.

The Australian languages, which, with great differences, present a remarkable uniformity of structure and phonetics throughout the continent, have also been compared with the Semitic, Aryan, and other systems, but with no

results, except where the unscientific method has been adopted. Thus *murry*, great, is compared with the Keltic *mor*, or the English *more*; *cobbera*, head, with the Spanish *cobra*, quite a modern formation; *gubber*, rock, with the first syllable of *Gibraltar*, of which the true Arabic form is *Jebel*; *hieleman*, shield, with the Anglo-Saxon *helian* or *heligan*, to cover, or with the English *helmet*, which the ingenious etymologists are careful to tell us is "a little shield for the head"; *cabohn*, good, with the French *bon*; *tiora*, land, with the Latin *terra*; *kirajî*, wizard, with the Greek *χαιρουργός*; *ruwi*, country, with the Latin *rus*; *takkin*, eating, with the English *take in* (why not *tuck in*?); *marti*, limestone, with *mortar*, beyond which it would be difficult to carry etymological eccentricity. Many of these languages are highly agglutinating, some even verging on true inflection; but scarcely any have distinct names for the numerals beyond 1 and 2, after which $3 = 2 + 1$; $4 = 2 + 2$, and so on.

This common feature alone should be sufficient to reject any Semitic, Aryan, or Dravidian affinities, for if the Australians came of any of those stocks, it is not to be believed that all the tribes would have agreed to forget their inherited arithmetical system, and stop short precisely at the inconveniently low numeral 2. At the same time it is conceivable that at an extremely remote age, while Australia still formed part of the Asiatic mainland, tribes resembling the Korumbas, Maravans, Todas, and other low-caste peoples of the Deccan, may have spread southwards and here amalgamated with others of a Papuan type from Melanesia. The result of such an intermingling might be a race not unlike the present average Australian—dark, prognathous, more or less dolichocephalous and with wavy or shaggy hair intermediate between the frizzly and straight. But these migrations cannot have taken place since the subsidence of the land, because none of the races in question are navigators, although some of the New Guinea tribes have recently learnt the art from the Malays. On the other hand the remoteness of the period to which such movements must be referred is no objection, for Australia has been peopled for many ages, as is evident from the vast kitchen-middens found on the coast, and some of which have already been used as manure by the white settlers.

The extremely low estimate of the Australian intellect formed by Mr. Wake and other ethnologists seems at least somewhat premature, and no one can turn over the pages of Brough Smith's great work on the Aborigines of Victoria without coming to the conclusion that the race has been much vilified and unduly depreciated by careless or superficial observers. Many instances are given of their skill even in drawing, a capacity for which was wholly denied them. They often show great quickness in adapting themselves to the ways of the white man, and the children constantly show themselves "quite as capable of receiving and profiting by instruction as the children of untaught parents among the white race" (*op. cit.* ii. p. 256). It was recently stated that the native school at Coranderk, on the Yarra, had gained relatively more passes than any other school in Victoria.

At the same time most of the tribes are addicted to extremely revolting practices, those by which the "coming of age" is celebrated being especially barbarous and disgusting. Some also, under unfavourable conditions, have either sunk to, or never risen from, the most debased condition compatible with existence. Mr. Taplin was acquainted with a Narrinyeri family, "residing on Lake Alexandrina, the members of which were as nearly brutes as they could be. . . . They subsisted on roots and native fruits, and such fish and game as came into their hands by means of the simplest contrivances, the thrown waddy, or the simple noose, and they were regarded by their own people as very low. They would not even make a shelter, but cowered under bushes and in holes; and yet it could not but be evident how far they were

above the brute. The man could make twine, the woman a rush basket" (*op. cit.*, p. 10).

Cannibalism has also been prevalent, assuming amongst some tribes a very revolting form.

Unfortunately not many of the Aborigines are left to benefit by the enlightened and humane system of treatment tardily introduced by the local administrations. There are probably not 30,000 left in all Australia; even those of Victoria, who are best cared for, are dying out except in a few favoured stations, and "Lalla Rookh," the last of the pure blood Tasmanian women, died in June, 1876. The Tasmanians differed in many important respects from the Australians. They were of darker colour and considerably less dolichocephalous, with decidedly frizzly hair, this latter feature bringing them into close connection with the Melanesians. In point of culture they stood almost on the lowest level, possessing no fixed abodes, wearing no clothes, never cultivating the land, unacquainted with the rudest arts, possessing neither domestic animals, pottery, nor the boomerang or bows and arrows of the Australians. They were divided into a great number of tribes, speaking as many as nine quite distinct languages, but so little developed that the sense was largely eked out with the aid of gesture and signs. Yet their cranial capacity seems to have been slightly greater than that of their neighbours (index 80 as compared with 78), while they were nearly as orthognathous as Europeans. These contradictions constitute the Tasmanian a type *sui generis*, allied partly to the Australian, partly to the Melanesian and Polynesian, with some special features which may perhaps be due to their long isolation from other races.

B—CAUCASIAN TYPE

IV. CONTINENTAL BRANCH: *Khmêr or Cambodian Group*

In Further India, with one exception, all the settled peoples forming recognised nationalities, that is, the Burmese, Thai or Siamese and Annamese, are physically of Mongolian stock, and all speak languages of the monosyllabic or isolating class. The same is largely true of the Mishmis, Khasias, Kukis, Nagas, Khyengs, Karens, and other wild tribes in the west and north-west, as well as of the Shans, Mou-tz', and many Miao-tz' tribes in the north. Hence the universal assumption that, excluding Malacca, all the inhabitants of the peninsula constitute one ethnical and linguistic group allied to the Chinese in the north and to the Tibeto-Himalayan races of the north-west, and with them forming collectively the great South-Eastern division of the Mongolian family. This comfortable theory was first shaken by the revelations of the famous French expedition of 1866-8 up the Me-Khong River, since when the writings of Dr. Thorel, Francis Garnier, E. Aymonnier, C. E. Bouillevaux, Dr. Harmand, and other French naturalists have made it abundantly evident that there is in this region an important non-Mongolian element, which must henceforth be taken into account. Yet so slowly does scientific truth make its way against long-established error, that the fact has scarcely yet been recognised in any comprehensive treatise on ethnology or linguistics. In a paper prepared for the meeting of the British Association in Sheffield in 1879, and since published in separate form,¹ I endeavoured to determine the true nature of this non-Mongolian element, and to point out its essential importance in connection with the classification of all the Indo-Chinese and Oceanic races. It was there shown that the Khmêr or Cambodian nation, the exception above referred to, together with a large number of kindred peoples inhabiting the Lower Mekhong basin and the region between that river and the Coast range running from Cape St. James northwards to the Chinese frontier,

form a distinct racial and linguistic group, of the same physical type as the Mediterranean or Caucasian races of the west, and closely akin to the brown Oceanic races of Malaysia and the Pacific.

The arguments brought forward in support of this view need not here be formally repeated, and it will be sufficient to vindicate the use of the term "Caucasian" as thus extended to the remotest Polynesian islands. It has been objected that there are no Aryan languages in the far east, and that the Eastern Polynesians are a brown race, consequently that the word Caucasian cannot here apply. But those who so argue seem scarcely to realise the nature of the problem. Caucasian is not a linguistic, but an ethnical expression; hence although the Aryan, Basque, Semitic, and many languages of the Caucasus have no conceivable relationship with each other, we do not hesitate to regard those who speak these languages as of one stock because their physical type is substantially the same. This type we conventionally call Caucasian or Mediterranean, which terms must be held to apply wherever the physical features implied by them are found, irrespective altogether of the language question. Why speech and type should not correspond is another problem, which admits of an obvious solution, but which cannot here detain us.

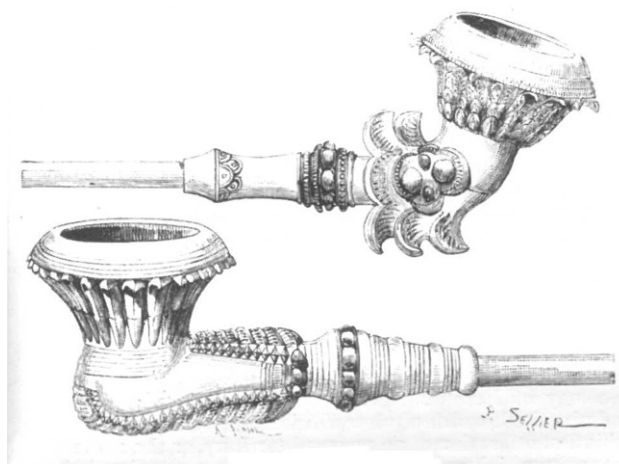
The objection based on colour, though more to the point, is scarcely more forcible. The brown Polynesians are not supposed to spring directly from the fair Europeans, but to have gradually spread from Indo-China through Malaysia to their present homes; and it will be presently seen that there are peoples in Indo-China brown enough to suit the Polynesian taste, and fair enough to claim kinship with the western nations. Besides, the question of colour must anthropologically be regarded as altogether of secondary importance. There are black Caucasians in Abyssinia, deep brown Caucasians in the Ganges Valley, dusky or swarthy Hamites and Semites, also Caucasians, in North Africa and Arabia; and why may there not be brown Caucasians in Polynesia? Surely the evolutionist, who does not hesitate to accept the development of the *genus homo* from some anthropoid ape, need not scruple about the relationship of the human species because of such a secondary matter as colour. Schweinfurth tells us that albinism is common amongst the negroes of the Nile basin, and there is at the present moment a clear case of melanosis in London. If these be regarded as morbid symptoms, they are often hereditary, and it has not yet been shown that they may not be cases of atavism, such as the reappearance of the bars on the pigeon's wing, however far removed from the original blue-rock type. *Nimium ne crede colori*, wisely said Linnæus, speaking of plants, and the remark is equally applicable to the animal kingdom. Observing that the black pigment does not make its appearance on the Negroes of Loango, West Coast of Africa, until after birth, the Berlin anthropologist Falkenstein suggests that it may be due to the action of the solar rays. If so, what becomes of colour as a fundamental characteristic at all?

Besides the civilised Khmêrs, forming the bulk of the present kingdom of Camboja and neighbouring Siamese provinces of Ongkar and Battambang, the chief Caucasian peoples of Indo-China are the Chams, Charays, Bolovens, Stiêngs, Suê, Xong, Cedangs, Rhoehehs, Banhars, Samrê, Lemets, and Kûys. The last of whom are looked on by the Cambojans as the primitive Khmêr stock; hence are called by them *Khmêr-dom*, or "original Khmêrs." In the paper above referred to the physical characteristics of these tribes are thus summed up mainly from Thorel:—"A fine, vigorous race, with symmetrical and well-set frames; stature rather above the middle size, straight profile, oval face, dolichocephalous head, high forehead, retreating very slightly, black hair, often inclining to brown, straight or wavy and elliptical in section

¹ "On the Relations of the Indo-Chinese and Inter-Oceanic Races and Languages." (Trübner, 1880.)

beard and whiskers well furnished and always frizzled, or at least wavy, eyes perfectly straight and horizontal, nose not particularly prominent, but nearly always straight and never flattened at the root, cheek-bones scarcely if at all prominent, mouth of medium size and even small size, with moderately thick lips but no trace of prognathism, complexion mainly of a bistre or brown colour, but varying from fair and even white to light brown and dark, though never so dark as that of the Aryans of India."

This description, given by a scientific observer, is the very antithesis of the Mongolian, and corresponds in all essentials to the ordinary Caucasian of Western Asia and Europe. Hence it is not surprising to find recent French writers freely applying to these peoples such epithets as "Caucasique," "Indo-Européen," "blanc," and so on. Bouillevaux calls the Chareys "white savages of Caucasian type." Thorel connects the northern tribes with "the Caucasian race, or more correctly with the Indo-European peoples." Dr. Harmand gives us a description of a beautiful Khang woman, dwelling particularly on her "aquiline nose, large eyes, thin lips, round shoulders," and other points of a European character. The Bolovens of Bassac he describes as of lighter complexion and taller than the surrounding Laos (Mongoloid) peoples, with sub-dolichocephalous head,



whereas that of the Laos is decidedly brachycephalic. Many Boloven women are remarkably beautiful in the European sense, with large straight eyes, regular features, and ruddy rather than yellow complexion. The colour of these wild tribes is often described as darker than that of their Siamese and Laos neighbours; but Dr. Harmand points out that this is due to the deep-rooted prejudice of the Laos, who habitually speak of them as even "black," though often fairer than the Laos themselves. The essential difference between the two races in this respect is precisely what we should expect, the Thai being more yellow, the Khâs, or Caucasian wild tribes, more red. This red or ruddy tinge was also noticed by Dr. A. Maurice amongst the Banhars, and the Piâks are even said to have wavy black hair with a russet hue, a trait never occurring in any pure branch of the Mongolian family.

These Caucasian tribes seem to be the true Aborigines of Indo-China, where they have been mostly supplanted, or driven to the impenetrable forests and highlands of the south-east by the intruding Mongol races, descending by the valleys of the great rivers from the Tibetan plateau. Still one branch, the Khmers, or Cambojans, were powerful and numerous enough to hold their ground in the lower Mekhong Valley, where, under Buddhistic influences, they established a flourishing

empire and erected monuments 2000 years ago, whose stupendous ruins rival those of Java and India itself in archæological and artistic interest. Indeed it may be doubted whether there is anything in the whole world

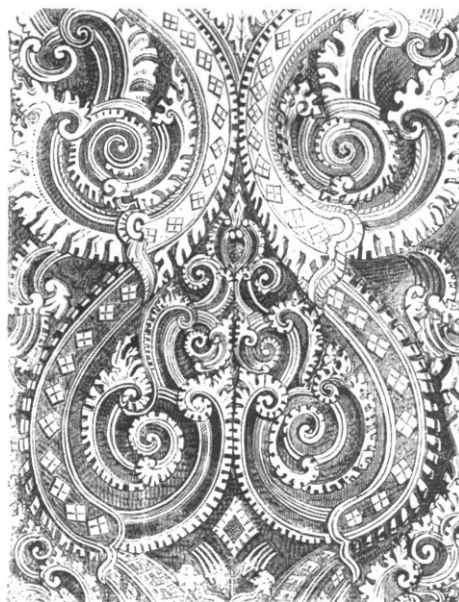


FIG. 12.—Ornamental Work on Sieng Quiver.

more wonderful in its way than the magnificent temple of Ongkor Vâht, on the northern shores of Lake Toulé-sap. It is noteworthy that the bas-reliefs and other figures on these monuments are of the same type as the present Cambojan race, with the same regular features, full beard,



FIG. 13.—Ornamental Work on Sieng Quiver.

and even their very dress, arms, and musical instruments. Traditions of this early civilisation still linger amongst the surrounding Khmêr tribes, many of whom, such as the Stîengs, Kîngs, and Chams, possess natural endow-

ments of a high order, cultivate their lands with great intelligence, are skilful workers in metals, and betray extreme taste in their decorative art. In the *Tour du Monde* for May 15, 1880, Dr. Harmand figures two native pipes and a quiver of a Stieng tribe, whose forms and arabesque designs are supremely beautiful (see Figs. 11, 12, and 13). "Their artistic instincts," this observer remarks, "are more developed and especially more original [than those of their Laos neighbours]. From them I have procured various objects betraying a refined taste, and woven fabrics with simple designs and well-harmonised colours." Amongst them there is prevalent a curious system of writing, at first sight somewhat suggestive of the Irish Ogham, but of a far more primitive character. It consists of a series of notches, varying in size and number, cut on both edges of a bamboo planchette, which is generally set up as a sort of public notice at the entrance to the villages. Thus a row made up of eight large, eleven medium-sized, and nine small notches was explained to mean: "Our village contains eight men, eleven women, and nine children." It is evident that in a system of this sort as wide a scope must be left to the imagination as in the hypothetical primitive speech, in which broken utterances are largely supplemented by signs and gesture. A. H. KEANE

(To be continued.)

GEOLOGY OF BOSNIA AND HERZEGOVINA¹

AMID the conflict of political parties, the jealousies of rival powers, the rumours of renewed dispeace among the nations, and the smouldering embers of war that seem ready at any moment to burst forth into renewed conflagration, it is a relief to turn to a volume in which the Austrian Government has just shown to the world one of the first uses to which she has put her new acquisitions in the East. Nothing could have been more quietly and unostentatiously done, and nothing could show a more enlightened and humanising policy than the action which is modestly described in the volume before us. The story is briefly told by the Ritter von Hauer in an introductory note. It appears that immediately after the pacification of the occupied provinces of Bosnia and Herzegovina the Director of the Geological Institute at Vienna addressed to the Minister of Public Worship and Instruction (under whom the Geological Institute is placed) a letter in which he pointed out the desirability of expanding the pacific mission on which the country had entered in these provinces by organising a geological survey of them under the guidance of the Geological Institute. His representations were acceded to, and on March 9, 1879, he received instructions to commence a geological reconnaissance of the provinces with detailed investigation of such localities as might be found of sufficient importance. The task was to be undertaken conjointly by the Geological Institutes in Vienna and Buda-pest. The Director was requested as soon as possible to submit a plan of survey with proposals as to the number of geologists to be detailed and the individuals most competent for the exhaustive discharge of the duties required; and he was further instructed to put himself in direct relations with the Hungarian Geological Institute with a view to a proper sub-division of the work. Ritter von Hauer had no difficulty with one part of his instructions. Two of his staff, Dr. E. von Mojsisovics and Dr. E. Tietze, had already signified their wish to undertake the work, and Dr. Bittner expressed his desire to share in it. After some delay the Hungarian Institute made known its inability, from want of a sufficient staff, to take part in the intended survey. At last, on March

23, Director Von Hauer was able to announce to the Ministry that he was ready to begin operations. He proposed that as the work would naturally fall into two sections, (1) the preparation of a geological sketch-map of the whole occupied Provinces, and (2) a special detailed investigation of localities affording indications of salt, coal, or ores, it would be desirable to arrange the officers employed into two divisions. For the preparation of the map he suggested that four geologists should be employed, which, estimating the area to be surveyed at 1000 square German miles, would give 250 square miles to each surveyor. He recommended for this duty the three gentlemen above-named, and added the name of Prof. Hörnes of Graz as the fourth, should the Hungarian Geological Institute have no other to propose. It was of course impossible that these officers, intrusted with the task of rapidly traversing the country and seizing on the salient features of its geological structure, should have time to halt anywhere long enough to make detailed investigations for useful minerals. This part of the duties however was one in which the services of the Hungarian Geological Institute might be especially useful, seeing that the distribution of ores in the Hungarian territory bore the closest analogy to that in Bosnia. The name of Herr F. Herlich of Klausenberg was accordingly suggested as one of the most competent persons to be intrusted with this part of the survey. It was further represented that the interesting and important coal and salt-spring region of Dolnj-Tuzla would be most fittingly explored by Herr Bergrath K. M. Paul, well known for his intimate acquaintance with the mineral tracts of Slavonia, Croatia, and the northern slopes of the Carpathian Mountains. Some further suggestions as to additional assistants were made. At last on April 7, 1879, the scheme of operations received the sanction of the Minister of Public Worship and Instruction.

By the beginning of May Herr Paul had broken ground in Bosnia. Before the end of the same month Herren von Mojsisovics, Tietze, and Bittner were likewise in the field, and undertook by themselves the whole burden of the map. In about three months the traverses for the construction of the map were completed, and the geological structure of a hitherto unexplored region of 1000 square German miles was added to our knowledge of the geology of Europe. One is at a loss whether most to admire the breadth of view which conceived and planned this first utilisation of an annexed territory, or the zeal and capacity which so rapidly carried out and completed the conception.

The *Jahrbuch der k. k. Geologischen Reichsanstalt* is one of the best-known and most useful geological journals in existence. The present number considerably exceeds the usual size of the periodical, since it is expanded by containing the reports of the geologists upon the recent survey of Bosnia-Herzegovina. Dr. von Mojsisovics takes West Bosnia and Turkish Croatia. In his report, after acknowledging assistance received in the country and enumerating the literature of the subject, in which the work of the veteran Ami Boué stands in the foremost place, the author proceeds to give a general outline of the topography and geology of the region examined by him. Most of his survey was done on horseback. He chose various traverses of the country, noting down by the way his observations upon the general map of Europe on a scale of $\frac{1}{300,000}$, published by the Military Geographical Institute of Vienna. The first section of his report is devoted to geological topography, and includes some interesting information regarding what has been termed the "oriental fixed land"—an ancient island or nucleus round which, in the Balkan Peninsula, the Lias and more recent formations have been ranged. The second section treats of the geological formations in stratigraphical order, the more important being Triassic, Jurassic, Cretaceous, and Flysch, the last-named belonging partly to the Cretaceous

¹ *Jahrbuch der k. k. Geologischen Reichsanstalt*, Band xxx. Heft ii., containing "Grundlinien der Geologie von Bosnien-Herzegowina," von Dr. E. v. Mojsisovics, Dr. E. Tietze, und Dr. A. Bittner, mit Beiträgen von Dr. M. Neumayr und C. v. John. Vienna, 1880. The work is also published separately by Holder of Vienna, with a preface by Fr. v. Hauer.